NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

PUMPING PLANT FOR WATER CONTROL – LIVESTOCK WATER SYSTEM – WINDMILL PUMPING UNITS

CODE 533-B

1. SCOPE

These construction specifications cover the materials and installation of windmills and windmill towers.

2. SUBMITTALS

The Installer shall furnish the NRCS Contracting Officer, or designee, written certification from the manufacturer that the installed windmill and appurtenances conform to the requirements of this specification. Submittals shall conform to the guidelines shown under SPECIFICATIONS – GENERAL (533-A).

3. MATERIALS

a. Pump Rod: The pump rod shall be a galvanized steel, hollow, airtight rod having a ¾-inch shaft diameter and integral couplings; or a fiberglass rod having a 5/8-inch shaft diameter and integral couplings. Suitable adapters will be included when required to make connections to the cylinder plunger and the polished rod.

b. Drop Pipe: The drop pipe shall consist of 21-foot joints of reamed galvanized pipe, threaded and complete, with long couplings having a quality equal to the pipe. The pipe shall meet ASTM A 120.

c. Stuffing Box: The stuffing box, with fitting cap, packing, and brass or steel rod, shall be heavy duty and meet the dimensions and pressure rating shown on the drawings. The piston (polished) rod, stuffing box, and pump rod shall be compatible as to thread type and size.

d. Well Cylinder Assembly: The cylinder assembly shall be an open top, brass-lined galvanized or brass cylinder having an inside diameter, barrel length, and pump stroke as shown on the drawings. The cylinder assembly will include a three-or four-leather plunger with a stainless steel or brass ball valve and a matching single leather check with a stainless steel or brass ball valve.

e. Polished Rod Assembly: The polished rod assembly shall be a ¾-inch-diameter polished steel core rod, fitted with a 24-inch-stroke-length brass or steel polished rod sleeve. The assembly will include a stuffing box having appropriate dimensions and suitable threaded adapters to fit the drop pipe and polished rod sleeve.

f. Pump Pole: The pump pole shall be of 2-by 2-inch redwood, or approved equal, and shall be straight and free from splits.

g. Sanitary Well Seal: The well seal shall be a split-base, single-hole style with expanding seal that will fit the well casing and the drop pipe. The seal will be of suitable strength to support the specified drop pipe and cylinder weight, including a reasonable safety factor. The seal shall have an access tapping and plug.

4. EQUIPMENT

a. Windmill Unit: The mill shall be complete (including oil), with sail wheel and tail assembly having automatic and hand-operated furl capacity. The mill shall be self-oiling, with replaceable bearings and parts. The size of the mill shall be as described on the drawings.

b. Windmill Tower: The tower shall be a new Dempster, Aeromotor, or approved equal, and shall be installed in accordance with the manufacturer's instructions and these specifications and drawings.

5. INSTALLATION

a. Windmills: Components are to be compatible and

function as a system. Upon completion of the installation, the fins are to be parallel to the tail and inactive.

b. Tower Base: The Installer shall excavate and form the windmill tower foundation to the dimensions shown on the drawings. Concrete construction shall conform to NRCS Specification 614, Watering Facility. Concrete shall cure a minimum of 5 days before the tower and windmill are erected.

c. Setting of Tower and Mill: The tower anchor posts shall not be used as an anchor or fulcrum in lifting the windmill or tower. Extreme care shall be exercised in attaching the tower to the anchor posts. In the event the anchor posts are bent, sprung, or otherwise damaged during installation of the tower or mill, they shall be replaced at the Installer's expense.

d. Alignment of Tower and Mill: Each tower and mill shall be set in a plumbed vertical line over the centerline of the well casing. The Installer shall test the plumbness of the installation by hanging a plumb bob from the pump rod connection of the windmill. When the tower is in acceptable alignment, the plumb bob will fall within the well casing, without touching it.

e. Joints: Threaded joints shall be properly lubricated prior to final installation.

f. Pump Pole: A pump pole of sufficient length shall be installed between the windmill and the pump in accordance with the manufacturer's instructions.

g. Drop Pipe: The drop pipe shall be installed to the depth specified on the drawings and shall have the pipe ends reamed to remove burrs prior to installation. The well cylinder barrel shall be fitted to the drop pipe prior to insertion into the well. The drop pipe shall be fitted with a final coupling, short nipple, tee, and another short nipple, all above the well seal. The uppermost nipple shall be fitted with suitable fittings to receive the stuffing box. An automatic bleeder orifice valve will be installed in the drop pipe 8 feet below the ground surface to drain that portion of the drop pipe to prevent damage by freezing.

h. Polished Rod Assembly: The polished rod, brass sleeve, and stuffing box shall be fitted and assembled in accordance with the manufacturer's instructions. The polished rod/pump rod/plunger assembly shall be raised a minimum of 6 inches, or at a distance specified by the Contracting Officer's Representative, above its lowest position in the well cylinder, and the guide stop shall be locked in this position.

i. Pump Rod: The pump rod shall be installed to the depth specified on the drawings. The pump rod shall be properly fitted to the cylinder plunger and the polished rod. Rod sections shall be straight and true and in lengths of 20 or 21 feet, except the final top section will be shortened by removing a midshaft portion to achieve the proper overall pump rod length. The midshaft reconnection shall be achieved by threading and coupling, electric welding, or other approved method. The final overall length shall be such as to expose approximately 4 inches of the polished rod brass sleeve above the stuffing box when in the low rod position.

j. Well Cylinder Assembly: The well cylinder and check shall be properly assembled and fitted to the drop pipe in accordance with the manufacturer's instructions.

k. Sanitary Well Seal: The well seal shall be fitted securely on the well casing and adjusted to insure a good seal. Special attention shall be given to the installation of the seal to provide a suitable anchor for the suspension of the drop pipe.

l. Concrete Well Platform: Construct a concrete platform around the well as shown on the drawings, extending 6 inches above finished grade. Finish concrete with a smooth wood float finish. The top of the casing shall be cut off to the elevation designated on the drawings. Concrete shall be in accordance with the above Item b, Tower Base.

m. Testing: When the windmill and well equipment are installed, the Installer shall use the windmill to pump a minimum of 24 hours. The Installer shall provide water storage facilities, if none are present

at the site, to collect the pumped water. The Installer shall check the windmill to see if the cylinder is functioning and not bottoming out, and that the windmill brake and other appurtenances are functioning properly. Problems shall be corrected by the Installer.

n. Sanitary Protection of Well: The Installer shall protect the well during the construction period to prevent vandalism, tampering, or seepage of contaminated water, petroleum products, or other contaminants into the well from the ground surface.

o. Correcting Contamination: If the well becomes contaminated, or water with undesirable physical or chemical characteristics enters the well due to the neglect of the Installer, corrective work including the supplying of seals, sterilizing agents, or other materials as may be needed to prevent contamination of the aquifers will be the responsibility of the Installer.

6. MEASUREMENT

Measurement of each windmill installation will be on a completed job basis.